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*Publication of The AMERICAN INSTITUTE of CHEMISTS*

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*In This Issue*

M. L. Crossley, F.A.I.C.

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Raymond D. Cool, F.A.I.C.

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Samuel Weisberg, F.A.I.C.

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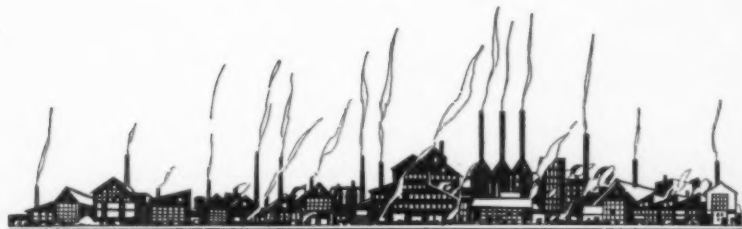
Ephraim Freedman, F.A.I.C.

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Kirby E. Jackson, F.A.I.C.

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News



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A luncheon of The American Institute of Chemists will be held at 1:00 o'clock April 25th, at the Hotel Martinique, New York City, following an 11:30 A. M. meeting of the American Chemical Society devoted to a discussion of unemployment and the professional status of chemists. Members of the Institute who are also members of the American Chemical Society are urged to attend the earlier meeting in the Chelsea Room of the nearby Hotel Governor Clinton to hear the reading and discussion of the report of the Unemployment Committee.

Members are urged to bring non-members who are interested in the welfare of chemists to this luncheon. Please make reservations now in the space below and mail them to The American Institute of Chemists, 233 Broadway, New York City.

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Please reserve \_\_\_\_\_ places for the Institute luncheon to be held at the Hotel Martinique at 1:00 o'clock April 25th. I enclose check for \_\_\_\_\_.

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Luncheon: \$1.00 a plate.



# The CHEMIST

Publication of

THE AMERICAN INSTITUTE OF CHEMISTS, INC.

ALAN PORTER LEE, F.A.I.C., *Editor*, 233 Broadway, New York City

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VOLUME XII

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## TABLE OF CONTENTS

	Page
Editorial. M. L. CROSSLEY, F.A.I.C.....	63
Chemical Microscopy. RAYMOND D. COOL, F.A.I.C.....	66
The Professional Chemist as Teacher. SAMUEL WEISBERG, F.A.I.C.....	73
Opportunity for Chemists. EPHRAIM FREEDMAN, F.A.I.C.....	76
Tear Gas and Smoke. KIRBY E. JACKSON, F.A.I.C.....	79
Book Review.....	84
Institute Notes.....	85
News.....	89

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1. S.G. Barker, Wool Quality, P-266-222—also Lit. Cited P-394-328, His Majesty's Stationery Office, London.
2. Consult Journal of Research, Nat. Bur. Standards, Vol. 13, No. 5 (Nov. 1934).

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## EDITORIAL

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### The Future Comes for the Chemist

THE chemist has an important part to play in the future development of our civilization. His rôle is not that of the disinterested individual who is working out his life's sentence at a job provided for him by society, but, rather that of the architect of human progress who is responsible for the design to which social growth and economic development are builded. He is expected to understand the significances of the changes which he would bring about by his investigations and discoveries. In his explorations, to the core of the atom or to the composition of the genes, he must be guided by the compass of human betterment and his course must be chosen from the best available experience charts, if he would avoid the shoals of selfishness, egotism, jealousy, indifference, laziness, pessimism, and all the other bars to progress, strewn over the entire course, on which his endeavors might founder. He must be more than a chemist; he will be an important citizen.

The achievements of the past are but samples of the contribution that the chemist will make to our future advancement and prosperity. Facts alone will not suffice. To be of the greatest service and do the utmost good the facts of chemistry will be scrutinized with greater care and correlated without prejudice. The deductions from experimental data will be made in the light of the economic good of society. This does not mean that every chemical investigation will be expected to lead to a pot of gold. It means that the progress made must be commensurate with the price paid for it. The chemist will be trained to think more about the cost of what he chooses to do and will have more responsibility for determining what should be done. A search for truth is always interesting, but not always worth-while. It is the intelligently planned search which should lead to the unraveling of important truths and result in fruitful discoveries.

What a chemist discovers is determined by what he is trained to observe. His capacity to observe is measured by his sensitivity to the phenomena about him. This is largely a matter of training. We see

only the things we wish to see and look for in our work. We must be capable of being inspired by our work and the work must have elements in its purpose which will keep us ever enthused and fired with the ambition to soar to heights where dwell only the most sublime and rare thoughts of man. For the most part we are only common, average individuals. However, it is only when we ascend to the lofty peaks of endeavor that we have any chance of success. These heights are not reached without a struggle, a great overpowering struggle which few have the endurance to win.

In the training the teacher chemist has an important mission. His task is more than to simply expose his erudite mastery of the abstract facts of the science of chemistry and the confused state of these facts; it is besides, to inspire men to want to know; to arouse that element of curiosity without which human imagination and skill are but wasted talents. Teaching must be inspirational to be educational. No worthwhile result is obtained in the educational process without the aid of the inspirational element. The teacher chemist must be more than a textbook spigot from which flows a continuous stream of chemical facts, formulae, constants, and equations.

The chemist must be educated, that is, he must be trained to think. To live up to his possibilities he must think beyond the facts of chemistry. It takes no unusual powers of foresight to see this. It is written in no unmistakable signs that all who will may read. By omitting the fundamentals from his training and studying only chemistry, and the related sciences to a limited degree, the chemist limits his possibilities to those of an artisan. It is time that we think this problem through to its logical conclusions. The responsibility is ours; we may not shift it to others. The teacher chemist must learn to teach; being a chemist does not necessarily make him a teacher.

We stand on the threshold of a new age. The conditions of the past are not good enough for the future. Either we learn from the mistakes of history to right the wrongs or we see our civilization fall. The latter must not happen. It can only be prevented by a constructive plan to use the best that we have in thought and resources to build for the future. In this the chemist has an important place.

In industry the chemist will have to give more thought to the economic factors involved in the business of applying his discoveries. He cannot overlook the effect that his recommendations and decisions may have on the entire business structure. He is not serving his company best unless he does. The waste of industry in the past has been an obstacle to progress. It will continue to be so unless the methods of

business are modified. A modification will take place. Either we regulate or we will be regulated.

The chemist will be faced with problems of adjustment in industry. He must be prepared to understand these problems and have courage to fight for what he believes sound in principle and practical in application. In particular the chemist will have to give much thought to the development of products and projects not already fully developed. The natural tendency is to rush madly into the production of products for which a market exists without giving adequate consideration to the question of the country's capacity to produce the products and the competitive market situation. The chemist must assume more leadership in directing the economic course of business.

The argument which so often leads the chemist astray in his judgments is that he must find a better and cheaper way of doing what is already being done. The zeal to achieve success overshadows adequate thought of the true value of the success. A thing is worth doing only when in the ultimate it helps to make life for all fuller and nobler. Disturbance in the economic framework of business is justified only when the ultimate good is greater than the cost of the changes. Creating something new is not in itself an advance in civilization. It must serve humanity better than that which it displaces or it must lead to the fulfillment of a need not met by anything previously available.

The chemist will be required to examine each problem that arises in the application of chemistry to see if it is worth solving before he undertakes its solution. He will see that the economic prices of raw materials and intermediates, used in the production of consumers goods, are independent of where they are made or by whom they are produced. He will have to learn that nobody is benefited by the pricing of consumers goods below costs. He must insist that each product shall carry its proportional share of the total cost of carrying on the business. To price certain raw materials and intermediates into finished goods at factory cost leads to the establishment of selling prices that are often too low to permit adequate development and what is worse compels every competitor to make his own raw materials and intermediates, thus duplicating investments in research and plants. The result is economic chaos.

In competitive business there must be economic reciprocity in the purchase of raw materials and intermediates. The chemist must play an important part in bringing this about. Where adequate capacity to produce these products exists, the chemist should strive to avoid the

*(Please turn to page 78)*

## Chemical Microscopy

By Raymond D. Cool, F.A.I.C.

In a talk given before the Pennsylvania Chapter, Dr. Cool calls attention to the value of the microscope in chemical work.

WITHIN recent years rapid progress has been made in the development of physical and physico-chemical methods and their application to analytical and research uses. Of the various instruments which are employed to determine physical properties the microscope is perhaps the most important, for no other one instrument can perform so many different functions. For a general analytical or research laboratory it is a more important tool than a colorimeter, a polarimeter, or refractometer. Indeed it can be made to function in all these capacities, and such a laboratory without proper microscopical equipment and somebody who can use it intelligently might well be considered as inadequately equipped as a laboratory with no analytical balance. In order to differentiate between the application of the microscope to chemical problems and the general term *microchemistry*, which is used to include all chemical methods dealing with a wide variation of quantities smaller than those formerly accepted as conventional or standard, Professor Chamot, of Cornell University, introduced the term *chemical microscopy* to include "those methods, principles, and phenomena of chemistry which may be studied particularly advantageously by means of the microscope." Therefore, while the subject of this paper may deal with something different from the more conventional analytical technique, no new chemical theory is involved.

A sub-committee of the Division of Chemistry and Chemical Technology of the National Research Council, when referring to the kind of education required by the technical research chemist, has said: "the microscope has come to be so valuable a part of research laboratory equipment that every research chemist should be well trained in its use," and at least one major chemistry department in this country agrees with the opinion sufficiently to require all chemistry majors to take a course in introductory chemical microscopy. However, in spite of indications of the benefits to be gained by its intelligent use, the American chemist has been slow to take advantage of the microscope

as an important laboratory accessory. This is partly because the ready development of acceptable microscopical technique and the ability to note and interpret correctly all the information available as a result of its application require training under the direct guidance of somebody qualified to give it. Most of the schools in this country which undertake to train chemists have failed to realize not only that some conventional methods may have their usefulness greatly extended by supplementing them with less conventional ones, but also that some chemical methods may become obsolete through development of better ones; and they sometimes have failed to provide training in the best methods of attack on chemical problems. Coupled with this lack of opportunity of becoming familiar with the instrument during his formal training period, probably the main reason the chemist has failed to use the microscope to the fullest extent is that he is unaware of the great variety of problems which can be solved through its use. It will, therefore, be the purpose of this paper to review very briefly a few of the applications of microscopy to problems of the chemist.

THE wide applicability of the methods of microscopy may be indicated by pointing out that the microscope is of service in colorimetry, observations of physical properties such as crystalline form, melting point, and refractive index, studies of allotropy and crystallization phenomena, examinations of abrasives, fillers, pigments, fibrous materials such as textiles, pulp woods, and paper, location of impurities in heterogeneous mixtures, identification of chemically similar substances such as starches, measurements of area and volume, estimations of weight, qualitative analysis, quantitative analysis of heterogeneous mixtures not subject to estimation by the usual chemical methods, molecular weight determinations, etc. Some of the general applications are so obvious that they need not be recalled, others will have to be passed with mere mention, while some of those which are probably less widely known but important will be treated more at length, even though very incompletely.

While it is possible to do many things with the microscope without using polarized light, the information gained with the aid of this accessory is so valuable in many instances that it is an indispensable part of the equipment. By its use differences in fine structure are more readily revealed and localized strain or deformation and non-uniformity in thickness are made readily apparent. A crystal examined between crossed nicols will behave in one of two ways when the stage of the

microscope is turned. It may have no visible effect upon the light passing through it and remain dark throughout a complete revolution of the stage, indicating that the substance has the same optical properties in all directions; or as the stage is rotated the crystal may appear alternately light and dark, showing extinction at 90-degree intervals. Substances having the same optical properties in all directions are said to be isotropic or singly refracting; those exhibiting extinction are known as optically anisotropic, birefringent, or double refracting. Extinction may be either parallel, with the crystal darkest when its axes are parallel to the planes of vibration of the nicol prisms, as indicated by the cross hairs in the eyepiece, and brightest midway between, or oblique, with the axes of the crystal inclined to the cross hairs at extinction. Examination of a crystal between crossed nicols will usually tell immediately whether the substance is singly or doubly refractive and indicate to which crystallographic system it belongs, for crystals of the cubic system are isotropic regardless of their orientation; those of the tetragonal and hexagonal systems have no effect on polarized light in one position but show parallel extinction in the others; orthorhombic crystals show parallel extinction in all directions, while those of the monoclinic system show parallel extinction in two directions and oblique in the third, and triclinic crystals show oblique extinction in all their directions. Although the observation of a single crystal in one position on a slide does not give sufficient information to decide its system, a number of crystals differently oriented will usually be visible so that the effect of light transmitted in different directions through the crystal may be noted. If the extinction is oblique, a measurement of the extinction angle may yield information useful in identifying the material under examination.

WITH the aid of hot stages melting points may be determined with minute amounts of material and with a high degree of accuracy. To facilitate simultaneous observations of temperature and fusion the scale of the thermometer may be projected into the eyepiece by means of a camera lucida. When viewed between crossed nicols melting points of anisotropic substances are readily obtained, because the solids become invisible the instant they melt to form isotropic liquids. An approximate melting point may be determined by heating the unknown and a known material side by side on a slide. This may be done conveniently by replacing the stage with an asbestos plate having a central hole through which the slide may be

heated with a micro burner, made of glass tubing, which is fastened to the substage so that it may be raised and lowered below the material to be heated.

Probably the most significant diagnostic physical constant for crystals is the refractive index. The prominence of the zone of contact between a crystal and its surrounding liquid medium depends upon the difference between the refractive indices of the two, being more pronounced the greater the difference. A crystal may be suspended successively in liquids, in which it is not soluble, of different known refractive indices until, when immersed in a liquid having the same refractive index as the crystal, its border completely disappears. In the case of isometric crystals there will be but one refractive index, but by placing the crystal of a doubly refracting substance in different positions with reference to a plane of polarized light several different refractive index values can be obtained for it. The refractive index of liquids in turn may be determined by immersing crystals having known values in them, or by a method depending upon the displacement of an image viewed through a layer of the liquid.

The physical conditions of substances are often of importance in determining the properties of the finished product into which they go. The microscope has become indispensable to the textile chemist and its value cannot be overestimated in detecting imperfections in the raw fibers, which, though imperceptible to the naked eye, may result in very pronounced imperfections in the finished product. The aggregation, shape, size, and uniformity of particles of substances employed in the abrasive, ceramic, paint, and rubber industries are of importance. Properties such as brightness, hiding power, oil absorption and tint in paint pigments, and resistance to abrasion in rubber are functions of particle size. In the clayworking industry the size of microscopic grains is of great importance in regard to appearance, cracking, plasticity, rate of vitrification, warping, etc. Ordinary screen analysis is of little value except in determining the small proportion of coarse grains in some fillers. It gives no idea of the true average size of grains, nor of their shape. The size of individual openings may vary as much as 30 to 40 per cent in wire cloth of fine mesh, and 300- to 350-mesh screens have a nominal opening of 40 to 50 microns, while, with the exception of a few special coarse ones, most high-grade fillers have an average grain size less than 15 microns. The specific surface is probably the most important factor in the subject of particle size, and screen analysis would be unable to differentiate between fine pigments having large differences

in specific surface, such as is found in various grades of zinc oxide. In the case of barytes it has been shown that particle shape, rather than factors such as fineness, surface activity, selective wetting, or adsorption, is the fundamental cause of certain abnormalities of material in which it has been used as a filler.

THE microscope can serve to great advantage in chemical education. Because of the rapidity of microscopical methods more reactions can be studied in the laboratory, and the small quantities of materials required permit experimental work with certain substances whose high cost prevents their use on the usual scale. Phenomena such as precipitation, supersaturation, digestion, and recrystallization, and the effects of concentration and the presence of colloids on precipitation are readily demonstrated. Microscopical methods are particularly suited to impress the student with the analogous behavior of members of families in the Periodic Classification of the elements. Thus, crystallographic similarity and interchangeability of chemically similar elements and the mutual replaceability of bivalent metals so widely found in natural minerals are made real to him. Phase changes such as polymorphic transitions, hydration, or formation of double salts and eutectic mixtures may actually be seen and not merely read about, so that they become real experiences of the student and not just something to be associated with phase diagrams.

In studying organic preparations the microscope may be used to follow intermediate steps in extractions, precipitations, etc., and to determine the presence or absence of the desired product in the crude reaction mixture, thus eliminating the time required for the usual laborious separations and tests. Such an examination would also indicate the presence of by-products, either expected or unexpected. In the purification process of the desired substance, microscopical examination may be used to show the completeness of its removal from the reaction mixture, and the presence of impurities in the separated product. Often the determination of a few properties such as extinction angle, or even of just the presence or absence of birefringence may give the desired information. Optical properties of new organic compounds might well be made part of their descriptive record, for a constant such as refractive index is no less valuable than the melting point.

The directness and rapidity of microscopical qualitative analysis constitutes its most practical and universal advantage. Failure to consider relative concentrations has led frequently to a misuse of

"sensitivity" and an overestimation of it, but in terms of absolute amounts the quantity of material dealt with is amazingly small. The streak made on a mineralogist's streak plate furnishes ample material for testing. This is especially appreciated when the specimen must not be injured as in the case of rare coins and archeological specimens. A skillful technician can take a satisfactory sample with the aid of a micromanipulator with such a slight alteration in the appearance of the specimen that not only is it unobservable to the naked eye, but even with the aid of a low power magnifying glass it is very difficult to find the region from which the sample was taken. Among the thousands who have admired rare paintings and museum articles, one probably could not find a single visitor who had detected the loss of material required in sampling by means of fine hypodermic needles and dental drills. However, microscopical methods, because of the economy of time, labor, and expense, are advantageous also in those cases where an abundance of material is available.

THE methods of qualitative analysis are not essentially different chemically from those familiar to every chemist, and only a few differences in technique will be pointed out. On the macro scale the insolubility of the product of the reaction is of primary importance while the appearance under the microscope, that is, the crystalline structure, is of greater importance in the micro. Thus the formation of silver chromate is a better confirmatory test for silver than the chloride which gives very small crystals. Concentrations should be kept as small as possible, and reactions should be used which do not give too insoluble precipitates, since in the majority of cases compounds of very low solubility precipitate either in an amorphous condition or in very minute crystals; for example, calcium sulphate is better than barium sulphate as a test for sulphate ion. Probably the most useful microchemical reagents owe their value to the property of forming double salts of low solubility, though not too low to form good crystals, and their frequent, but by no means universal, independence of other elements present. Though the macro methods of group precipitation may be used, the amorphous or colloidal character of the precipitates often formed is somewhat objectionable. Usually there is little need for following an analytical scheme, and reagents are used which give reaction products of large well-defined crystals and enable indication of a number of elements at once, followed by specific individual reactions as a confirmatory test.

When confronted with the problem of estimating the probable percentage composition, or the presence and amount, of materials which cannot be analyzed chemically on account of their complexity or because ordinary analytical methods would not differentiate the various constituents, quantitative microscopical methods are available to the chemist. In the case of adulterations or impurities, sometimes the appearances are sufficiently different to be readily seen by ordinary microscopical examination. Frequently they are not, but the use of polarized light or mounting media of different refractive indices may yield conclusive information. Where an estimate only is needed the economic possibilities of chemical microscopy assume considerable importance, for any sacrifice in accuracy may be more than offset by the completeness of the information gained and the great rapidity with which it is obtained. Instead of grinding a whole specimen and getting its average composition, segregations, and local variations in mixtures may be removed by micro manipulation and be estimated quantitatively.

In conclusion it should be pointed out that the microscope is not an automatic recorder and interpreter which can do things by itself without the aid of trained human intelligence. It does make available to the chemist some very useful things, but it is necessary for the observer to find and interpret them, which means that he must be not only a good technician but also an informed and thoughtful chemist.

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## The Professional Chemist as Teacher

By Samuel Weisberg, F.A.I.C.

A biographical sketch of Dr. E. Emmet Reid,  
of Johns Hopkins University.

THERE is a difference between the attitude of the average professional man toward his daily tasks and that of the average business man (the business man who punches the time clock). Most of us have been under the necessity of working by the hour at some time or another in our careers and there are memories tucked away in the backs of our heads of clock watching and kindred habits which developed spontaneously under that sort of system. However, the man who is not bound to work by the clock, whether his work lies in the laboratory or the office, is in a profession, and by profession we mean that sort of work which is never done—that sort of work which is reluctantly laid aside at the close of day to be taken up again next morning as soon as formalities of breakfast are over.

With this preliminary let us introduce E. Emmet Reid, Ph.D., Professor of Chemistry at the Johns Hopkins University, a professional man. Dr. Reid was born at Newcastle, Va., on June 27, 1872. He received the M.A. degree from Richmond College in 1892, the Ph.D. from the Johns Hopkins University in 1898, and the LL.D. from Richmond College in 1917. Dr. Reid started out in life a confirmed teacher—it may be better to let him tell it in his words, "I grew up with the idea that I wanted to teach. At first I expected to go into mathematics but by the time I left college I was more interested in physics. I taught two years in a small college in Louisiana and during that time I went over to chemistry."

This small college was Lebanon College and the years—1892 to 1894, the second situation being at Charleston College from 1898 to 1901. From 1901 to 1908 Dr. Reid taught chemistry at Baylor University. From 1909 to 1911 he was Johnston Scholar at the Johns Hopkins University. Three years were spent in research with the Colgate corporation, from 1911 to 1914, after which he returned to Johns Hopkins as Assistant Professor. From 1916 until the present time Dr. Reid has been full Professor of Chemistry and lately Secretary of the Department.

**D**URING the War Dr. Reid was one of the first half dozen in the Chemical Warfare Service investigation starting May 1, 1917, under the Bureau of Mines. "On May 30, 1917," he writes, "I took a sample of chloracetophenone to Washington but it was not tested for about six months. It is the tear gas that is now used." As for his later war activities, "We converted the Johns Hopkins University laboratory into a war gas laboratory during the War. Frazer, Patrick, and Lovelace were on the defensive side and I was on the offensive. We operated as a branch of the American University in Washington. The chemical side of the manufacture of butyl mercaptan was worked out in my laboratory and a plant known as 'The Great Iron Skunk,' capable of making three hundred pounds of butyl mercaptan per day, was put up and operated in Washington." That must have been a job! And what a scramble would have ensued if this Ferric Skunk had burst! Other tales have drifted out of this war time laboratory both in Baltimore and in Washington—of a chemist in the latter city who worked with a bird cage on the desk in front of him, keeping one eye on the bird. Any war gas which happened to break loose was supposed first to knock out the bird, giving the investigator time to make good his escape before it was too late.

Dr. Reid is a member of the American Chemical Society, Deutsche Chemische Gesellschaft, Société Chimique de France, Society of Chemical Industry, American Institute of Chemists, and The Chemists' Club of New York City. His scholastic honors include Phi Beta Kappa, Sigma Xi and Pi Gamma Mu. He is married and has three children, is independent in politics and Baptist in religion. Dr. Reid's publications are legion. He translated Sabatier's "Catalysis in Organic Chemistry" and wrote the first book intended as a manual for research students in Organic Chemistry, his "Introduction to Organic Research." Lately a textbook "College Organic Chemistry" has appeared under his name. He is the author or joint author of over one hundred and eleven journal articles of research to be found in the *Journal of the American Chemical Society*, the *American Chemical Journal*, and *Industrial and Engineering Chemistry*. The subject matter covered ranges over almost the entire field of organic chemistry: amides, esters, sulphur compounds, hydrocarbons of all sorts; aromatic chemistry, especially substitution reactions, thermal reactions, etc. Later work covers the investigation of the influence of sulphur on the color of dyes, the ethylation of benzene, and the study of derivatives of mustard gas. High-speed stirring has also received some of his attention.

IT IS entirely in keeping with the spirit and traditions of chemistry at the Johns Hopkins University—the digging away at and the uncovering of the fundamental facts of our science—that one of Dr. Reid's papers dealt with that well-known reaction known as esterification. His work tended to corroborate the mechanism of Henri whereby the alcohol is assumed to add to the carbonyl of the acid, giving a dihydroxy, monoalko-compound which then splits off water to give the ester. Dr. Reid's work tended to show that esterification can be represented for all practical purposes as formation of ester and water by splitting off of hydrogen from the alcohol and hydroxyl from the acid. As a corollary to this work he also showed that the equilibrium in the vapor phase is quite different from that in the liquid.

A second fundamental contribution consisted of a systematic study of twenty-two octyl alcohols, first as to their preparation, which was carried out in the Johns Hopkins organic laboratories. The writer still has vivid recollections of classmates who insisted on working with butylaldehyde in the laboratory, then walking across the campus to the dining hall of the dormitory during which time the aldehyde was most successfully oxidized to butyric acid by the oxygen of the air. The result in a room closely packed with students all busily eating dinner can be imagined. However, enough of these octyl alcohols were prepared and in sufficiently large quantities to enable samples to be sent to other investigators for the determination of their physical constants. This was indeed a fine example of scientific cooperation.

In response to a request for an account of his recent trip to England, Dr. Reid replied, "As to the trip to England, it was a long trip but a short story." The high lights seemed to be "thirteen days in London which included the meeting of the Society of Chemical Industry and then eighteen days in a hired English car during which I drove two thousand miles on the wrong side of the road." Apparently Dr. Reid believes in sharing his good times, for "Mrs. Reid and the three children made the trip with me and we saw more than we can remember—a trip I would recommend to anyone."

In closing his letter to the writer of this article Dr. Reid summarizes things to his own satisfaction by writing, "I do not consider myself an interesting individual as I am neither brilliant nor eccentric—a poor subject you have but we will hope for the best." Let the matter be left to the readers—what sort of man is needed to have over fifty Ph.D., candidates to his credit—brilliant or not? As for the lack of eccentricities—doubtless he is right on that point.

## Opportunity for Chemists Is Seen in Consumer Acceptance Trend

By Ephraim Freedman, F.A.I.C.

A talk given by the Director of Macy's Bureau of Standards before the New York Chapter on February 15, 1935.

**A**LTHOUGH the subject of my talk has been announced as, "Chemistry and the Trend of Consumer Acceptance," I feel more free to talk about, "Opportunity for Chemists Seen in Consumer Acceptance Trend." With this as the title, I will first attempt to give you my interpretation of consumer acceptance. Consumer acceptance is approval of merchandise by the consumer, such approval being founded upon a statement of comparative worth accompanying the merchandise and substantiated by subsequent experience incidental to its normal use. Now this definition appears to be very long and drawn out. Concentrated in a few words it simmers down to a question of whether or not the consumer is getting what she thinks she is. Of course, there are all sorts of exceptions, but they only go to prove the rule for that which is sometimes viewed as normal is actually found to be otherwise. Much has been said during the last few years concerning consumer acceptance but relatively little progress has been made.

A Consumer Advisory Board was created and its representatives were asked to sit in during the development of various codes and to present for consideration the hitherto unorganized consumer views for inclusion into the codes. Out of the experiences of these and other consumer bodies there has developed a distinct and insistent consumer demand for factual information which will permit of the evaluation of merchandise. Industry has found itself unable to supply this rapidly growing demand and for good and sufficient reason. First of all there is quite a divergence of opinion relative to proper terminology. This opinion exists within industry itself. Take castile soap for example—or wool—or silk—or the term "waterproof." Then there is the lack of information necessary for the relative evaluation of merchandise in terms of performance and durability. Again industry lacks sufficient approved test methods and recognized standards. These limiting conditions are aggravated by dark and sinister thoughts. Who will

be held responsible in the event that merchandise is unsatisfactory? Supposing deliveries are switched, how will they be recognized? When raw materials lose their identity in the finished product whose word shall be taken as to whether they have or have not been used? What shall constitute reasonable serviceability and who shall pass upon it? How about style versus wearability? Who shall be qualified to judge the merits or demerits of an article? Industry therefore insists that its problems are legion and incapable of solution.

CONSUMERS are organizing bigger and better clubs all over the country. They are going back to school, attending lectures, listening to theories, some practical, some otherwise. They are being coached to demand information and to scrutinize carefully any statements accompanying their purchases. Consumers are actually spurring on retailers and manufacturers alike to greater efforts on behalf of consumer acceptance. Whom to go to is the question? Consumers, lacking the organization of industry, turn to the Government. Now the Federal Government is probably in a position to expend unlimited funds and manpower and equipment and what not, but its activities are limited to interstate transactions. State and municipal governments are incapable of such undertakings and when they attempt them they more often than not throw both industry and consumer into everlasting confusion. I agree that there is a place for government in the order of things, but its efforts should be directed rather toward the development of cooperation, among the various parties, than toward the encouragement of the creation of inter-industrial, professional, and consumer bodies having for their sole purpose the satisfactory solution of problems of mutual welfare. Private enterprises should be encouraged on the basis of ability as to who best can serve, rather than which favored interests can best be served.

Most chemists are engaged in private enterprises, either for themselves or for others. These chemists have probably done more for present-day civilization than any other single group of men. Our foods and drugs, the clothes we wear, the homes we live in, our means of transportation and communication, weapons of offense and defense are all what they are today largely because of the constant attack upon these problems by chemists. Now, we at Macy's have been pioneering with Consumer Acceptance problems for many years. Recently the National Retail Dry Goods Association during its annual convention set aside an entire day for the discussion of serviceability. Consumers, retailers, service organizations, and manufacturers had their say and

much was said. The result should prove quite interesting to all of us as chemists.

Briefly speaking, Industry is waking up. Industry needs chemists capable of solving industries problems in terms of Consumer Acceptance. Industry is casting about for chemists capable of developing yardsticks for consumers. Laymen, whether they be manufacturers, retailers, or consumers, are not particularly interested in technical data. Advertising people look upon it as they would the measles and readers read something else. The job is just up to the chemists to develop and translate this technical data in terms of consumer acceptance. How are we going to do it?

The answer is obvious. By making intensive studies of the products of these industries and describing their properties in easily understandable language. We must even go further. We must help serve up these facts in a manner to encourage the buying of quality and value. We must help deter the foisting of poor values on the unsuspecting purchaser. Chemistry has proven its worth again and again but chemists must prove their ability to help industry and the consumer to evaluate merchandise to their mutual satisfaction. For some chemists this is going to prove a golden opportunity. Are we going to let it slip by or are we going to accept the challenge as developed by the trend of consumer acceptance?

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## EDITORIAL

*(Continued from page 65)*

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Chemistry is involved in so much of life that the chemist finds his problems interwoven fibers of many different strands. To unravel these he must be in touch with many phases of life. He must be competent to solve the problems and capable of understanding the significance of the results in influencing the progress of humanity. Thoughts, feelings, emotions, and actions involve chemical reactions which the chemist will be expected to know more about in the future. He may be privileged to know the secrets of cellular activities in the human body and to provide tests for the recognition of the onset and the end of the cyclic periodicity of such activities. By establishing these data he will help to banish fear with pain to the Stygian caves of oblivion there to dwell with the forces of superstition and doubt to the end of time. Truly, the future comes for the chemist.

M. L. CROSSLEY, F.A.I.C.

## Tear Gas and Smoke

By Kirby E. Jackson, F.A.I.C.

Tear gas and smoke as humane agents  
for the control of civil disturbances.

THE problem of handling civil disturbances has troubled civilian and military authorities since the foundation of national governments. In ancient times and down to the middle ages it was the practice of authorities to use force regardless of the situation. With the introduction of firearms it was a simple matter to disperse a mob with a well-directed volley of shots which required less time and a smaller personnel than had been necessary up to then. In either case the object was the same and the result similar—a number killed and wounded. The use of bullets to control unruly individuals or mobs when this control can be attained by the use of smoke or lachrymators is a crime which should no longer be tolerated in civilized nations.

The World War brought to our attention means which had long been known but not often used—chemical agents. The first recorded effort to overcome an enemy by the employment of chemicals was when the Spartans saturated wood with pitch and sulphur and burned it under the walls of Plataea and Belium (during the wars of the Athenians and Spartans, 431–404 B.C.) in the hope of choking the defenders and rendering the assault less difficult. Polybius relates that, at the siege of Ambracia by the Romans under Marius Fulvius Nobilior (B.C. 189), the Aetolians filled jars with feathers, which they set on fire, blowing the smoke with bellows into the face of the Romans in the countermines.

One of the most famous chemical means of attack, Greek Fire, developed by Kallinikos about 660 A.D. was a combination of gas and smoke. This contained, in addition to pitch, resin, and petroleum, also sulphur and quicklime. If thrown upon water, the quicklime generated sufficient heat to ignite the petroleum which, in turn, ignited the other combustible substances. The lighter hydrocarbons, in disengaging from the evaporating petroleum, formed an explosive mixture with air, and explosions took place with consequent development of enormous clouds of smoke and soot. The sulphur, catching fire, generated sulphur dioxide, which rendered approach difficult and served to expel the enemy from his position. It was very difficult to extinguish this fire since

pouring water upon it only served to spread the petroleum and thus disseminate the base.

One of the earliest instances in the employment of smoke was in the crossing of the Dvina River by Charles XII of Sweden in 1701. Under cover of thick smoke produced by burning damp straw, Charles successfully crossed and assumed battle position in the face of superior forces before the enemy was able to comprehend the maneuver. Some evidence exists to show that screening smokes were used in the War of 1812, and at the siege of Charleston during the War between the States. In addition to the employment of screening smoke the besiegers of Charleston burned wood, which had been saturated with sulphur and pitch, under the parapets in the hope of smoking out the defenders.

OUR history indicates that no small part of the military activities in which United States troops have been engaged, has been fought against semi-civilized opponents. To mention specific encounters, there were the Indian fights in the era of our expanding frontiers and insurrection in the Philippines. The fighting of such guerrilla warfare has always been extremely difficult; casualties in battle have been far out of proportion to the significance of the results accomplished. It is believed that by making use of the weapons which chemical warfare provides, losses could be reduced materially. Had tear gas, smoke, and gas masks been available to our forces in June, 1913 when they attacked the Moro cottas on Bud Bagsak on the island of Jolo, numerous casualties on our side and hundreds among the Moro, including women and children, who not infrequently accompany their men into the cottas and fight almost as well as the men, could have been prevented. Had a few projectiles filled with tear gas been fired into the cottas early in the fight the Moros could have been disarmed with comparatively little loss of life.

Semi-civilized peoples have absolutely no protection against chemical agents of any kind. It is believed that for many years to come such agents can be considered as an effective and, at the same time, a humane weapon for use against such peoples. However, there is a likelihood that public sentiment might frown upon the use of gas and smoke in this type of warfare but increased knowledge of the true nature of chemical agents should be convincing that they are more humane than some of the agents of destruction now in common use. The chemical agents introduced during the World War proved very effective as shown by the reports of the War Departments of the countries involved and the increased number of gas shells fired during the latter part of the War.

Despite these facts there is still an unholy fear of such agents by the average citizen due to the mass of war propaganda against the use of gas and to lack of accurate information. Men fear the unknown; it is easier for men to maintain morale in the face of bullets, naked bayonets, and the sword's edge than in the presence of invisible gas. There is always uncertainty in their minds as to the effects of the gas and as to what is behind the smoke, whereas the only real danger of serious injury from using non-toxic tear gas and smoke is from the possibility that members of the crowd may be trampled upon in attempts to escape. Should some of the trouble makers be killed in such a rush, does the public take into consideration the fact that they were rioters as justification of their deaths? It does not. It is even more than likely that it will condemn those ordering the release of the chemical agent as severely and perhaps more so than if firearms had been used. Because of this fear and of the effects produced by the several agents, discretion must be exercised in their use.

**H**OW then is it possible to use chemical agents as a weapon against civil disturbers so that the crowd may be dispersed without loss of life? One of the chief things to consider is the escape of the crowd. Avenues of escape must be left open so that the participants and innocent onlookers can get away rapidly from the scene of trouble. In making their escape they will naturally scatter and that is exactly what is desired, for the mob spirit is then broken up. Releasing chemical agents into a mob that is cut off from escape produces the same results as does a fire in a crowded theater provided with inadequate exits.

The question of the particular chemical agent to be used is also of vital importance. Toxic agents should never be used. Tear gas is quite effective, as is also smoke. The latter is not infrequently the most desirable agent; and of the several smokes, white phosphorus should always be eliminated because the chance is too great of frightful, slow-healing burns. Smoke places a blanket over the crowd and reduces it to a group of individuals in which each member is separated from his neighbor. The mob spirit is thus greatly broken up for though the crowd may all have the same purpose in mind each individual loses, to a certain extent, the feeling that the crowd is backing him, and the importance of his particular grievance seems lessened. The leaders of the mob cannot be seen and their influence cannot be exerted upon the members. Lacking leaders, the feeling of isolation will cause the individuals to look for means of escape and if the way is open the crowd will quickly break up.

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*(Continued from page 65)*

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As to the times when chemical agents can be used, we can look back and see that there have been numerous opportunities for their use since the World War. The use of non-toxic chemical agents during the riots and disorders that followed the Boston police strike in 1919 would doubtless have accomplished the same end without loss of human life and enormous property damage. The I. W. W. demonstration at Centralia, Washington, in 1920, when some I. W. W.'s attacked an Armistice Day parade, killing four World War veterans, could have been stopped with gas instead of rifle fire. In the coal strike in Colorado in November, 1927, "the state police and mine guards poured gun-fire into a crowd of 500 striking coal miners and I. W. W. agitators approaching the Columbine Mine, near Denver. Moral suasion was used against the crowd without effect, then bullets were resorted to; five or six persons were killed on the spot and more than a score of others, including two women, were wounded." How different might this have been had a few CN (chloracetophenone) grenades and smoke candles been available. The first appearance of a little smoke would have stampeded them and a little tear gas would have completed the rout. The strikes among the miners at Butte, Montana, and in West Virginia likewise offered opportunities for the use of chemical agents in preventing the destruction of property and loss of life. The attacks upon garment workers in New Jersey could have been broken up with lachrymators or smoke; the bloody battles waged in Herrin, Illinois, probably would have been less bloody if chemicals had been employed instead of bullets. Had the authorities in Barre, Vermont, been provided with a few smoke candles and tear-gas grenades they could have dispersed effectively the crowd which had congregated, but instead "seventy-five soldiers charged the crowd with fixed bayonets, cutting, wounding, and tearing the clothing of men, women, and children indiscriminately." In the series of attempted jail and penitentiary breaks and bank robberies, which recently have swept the country, tear gas and perhaps smoke would have proved just as effective without the loss of life. The recent carnage in Havana is still fresh in the mind of the public and the ruthless killing of misinformed, jubilant citizenry could have been avoided by the proper use of tear gas and smoke candles.

**D**URING the labor disturbances in 1922 a mob of miners were quickly and easily brought under control at Coatesville, Pa., by a lone state police officer using three tear-gas grenades. This officer endeavored to stop a mob organized for the purpose of destroying the mine works. His orders to disperse were disregarded and, being

threatened by one miner, he quickly threw three tear-gas grenades just in front of the mob. The effect was instantaneous and the mob stampeded, most of them before actually feeling the effects of the tear gas. No further trouble was experienced in this vicinity during the strike. Three thousand strikers of the Amoskeag Textile Mills in Manchester, New Hampshire, were dispersed before a wave of tear gas and quickly brought under control. The Chemical Warfare Service as far back as 1920 suggested the use of a simple tear gas (chloracetophenone) in small hand grenades as a most effective and humane method of controlling mobs and unruly individuals. Since that time it has developed several types of harmless non-explosive tear-gas grenades which have proven so effective that the police departments in nearly all the larger cities of this country have adopted them and they are now being manufactured by commercial firms.

These devices may be used by persons of average intelligence with less training than is necessary for the proper use of firearms, and any misuse of tear gas could hardly have the disastrous effect possible from firearms. In concentrations obtainable in the open, chloracetophenone has no poisonous effect, but acts only upon the eyes. It causes a sharp stinging sensation in the eyes followed by a copious flow of tears; higher concentrations cause the eyes to remain completely closed. These effects usually last for not more than a few minutes after leaving the cloud. There is no record of a person being permanently injured by any effect of this agent. Although the physiological effects of tear gas are potent the psychological effect may be even more so.

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The April issue of THE CHEMIST will be a special issue containing a number of papers devoted to the social and economic advancement of humanity resulting from the work of chemists in each branch of chemistry during the last 300 years of chemical industry in America.

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## Translations

German, Spanish, French translations typed. M. R. Elmendorf, 301 W. 22nd  
made at reasonable rates. Manuscripts St., N. Y. C. Telephone Co. 7-0659.

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## BOOK REVIEW

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THE CHEMICAL FORMULARY. Volume II. D. Van Nostrand Company.

The subtitle of this volume "A Condensed Collection of Valuable, Timely, Practical Formulae for Making Thousands of Products in All Fields of Industry" indicates its nature, as well as its scope. To the chemist, the question is how well it fulfills its promise. And the answer is that in the opinion of this reviewer it does so quite well, and very much better than did the first volume of this set. The subject matter is divided into twenty-seven chapters of formulae ranging from adhesives and agricultural specialties through rubber and textile fibers. There are also chapters on patent laws, on chemical compounds, first aid, some usable tables of weights and measures, and a special listing of trade named compounds and their suppliers.

The formulae in this volume generally have been edited with a great deal more care and scientific accuracy than were those in Volume I. It is unavoidable that there should be an occasional error, such as the formula for glass etching solution on Page 240, which contains only HCl, H<sub>2</sub>SO<sub>4</sub>, and water. However, a somewhat greater objection is the lack of discrimination in separating paragraphs. Some, which should follow in sequence, are divided by a printer's mark, while with others, there is no indication of the break in subject matter.

One doubts whether the chapter on patent law will prove to be of any great value to the user. The first aid chapter and the tables seem to indicate that the book is intended to reach a lay public as well as the profession and on this basis, its wisdom may be doubted. Purely for the chemist's library, however, the book should prove a welcome and useful addition.

K. M. H.

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## Civil Service Examinations

File applications for positions of chemist, and senior, associate, and assistant chemists with the U. S. Civil Service Commission at Washington, D. C., not later than April 8, 1935. Entrance salaries from \$2,600.00 to \$4,600.00 a year. Vacancies in Food and Drug Administration, Department of Agriculture, and a vacancy in Dental Alloy Laboratory of National Bureau of Standards will be filled from these examinations. Full information may be obtained from the Secretary of the U. S. Civil Service Board of Examiners at Post Office or from the Commission at Washington, D. C.

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## INSTITUTE NOTES

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### OFFICERS

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Calco Chemical Co.,

Bound Brook, N. J.

ARTHUR J. HILL, *Vice-President*

HOWARD S. NEIMAN, *Secretary*

233 Broadway

New York, N. Y.

ALAN PORTER LEE, *Treasurer*

### COUNCILORS

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LLOYD VAN DOREN

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## National Council

### *February Meeting*

The one hundred and nineteenth meeting of the Council of The American Institute of Chemists was held at The Chemists' Club, 52 East 41st Street, New York, N. Y., on Thursday, February 21, 1935. President M. L. Crossley presided. The following Councilors and Officers were present: Messrs: R. A. Baker, M. L. Crossley, H. S. Neiman, C. W. Rivise, L. Van Doren, F. W. Zons, and Miss F. E. Wall.

The report of the Treasurer showing a cash balance of \$886.44 and assets of \$272.06 over liabilities was accepted. The Secretary read the report of Alan Porter Lee, Editor of THE CHEMIST, to the effect that the November and December issues had been consolidated into one issue, which has appeared;

the January issue has been mailed to the members; and that the February issue is now on press and is expected to appear within a week. Upon motion made and seconded, the report was accepted and filed.

The Secretary reported that he had received the names of a large number of chemists who had been suggested for membership and after discussion the Secretary was directed to refer all of these suggestions to the Committee on Membership, in order that they might devise a method of procedure.

The Secretary read a report from T. A. Wright, Chairman of the Committee on Emblem Designs, containing a number of suggestions, and upon motion made and seconded, the design referred to therein as number 2 was accepted ten-

tatively, and upon motion made and seconded, it was decided that the emblems be submitted to the membership.

The Secretary read a letter from Edwin Hutshing relative to the attitude of The American Institute of Chemists toward proposed legislation requiring M.D. degree for the licensing of bacteriological and clinical-chemical laboratory chemists, and the letter was referred to President Crossley for answer.

The question of the medal award was discussed and several names suggested for the Jury's consideration.

The Secretary reported upon the present membership.

The following new members were elected:

#### FELLOWS

CARL H. RASCH, *Chief Chemist*, Riverside Chemical Company, N. Tonawanda, N. Y.

MEYER SAMSON, *Consultant*, Samson Laboratories, 1619 Spruce Street, Philadelphia, Pa.

THEODORE R. MILNE, *Research Chemist*, Du Pont Rayon Co., Station B, Buffalo, N. Y.

#### JUNIOR

MICHAEL RUSSO, *Research Chemist*, N. Y. Quinine and Chemical Works, 99 N. 11th St., Brooklyn, N. Y.

On motion made and seconded, the publication of the roster is to be postponed until after the annual meeting. The Secretary was requested to bring the present roster up to date for use of the Committee on New Members.

Upon motion made and seconded, the date of the annual meeting was tentatively fixed for May 18th, and the Philadelphia Chapter is to be requested to consider the possibility of holding it in Atlantic City.

Upon motion made and seconded, an official letter of sympathy and flowers are to be forwarded to Dr. Taggart, in view of his present illness. There being no further business to come before the meeting, adjournment was taken.

## New York Chapter

A large and interested group listened to Dr. Walter H. Eddy and Mr. Ephraim Freedman on the subject of Chemical Research in connection with the consumer. Dr. Eddy spoke splendidly in defense of the new type of advertising. He pointed out that the food chemist had learned much about the true value of foodstuffs, but that ordinarily his words would reach but few who might profit from his studies. Technical journals, technical publications, and even books written especially for the lay public must of necessity reach only a few people over a long period of time, but the advertisement that tells a vitally important health message appears many times simultaneously in every important publication, in every community, and

before every class. True the origin of the work is frequently to find, new selling points about a product, but these selling points are honest ones by which the public may well profit.

The study of nutrition has a three-fold object. It removes the foolish prejudice and foolish worship of certain foodstuffs. It finds the true needs of the body, and it tells its findings to all who may profit by them. This last objective is accomplished best by the advertising medium. Dr. Eddy believes that food research opens a big field to the chemist. He considers it an excellent field in which to work for a Ph.D.

Mr. Freedman's talk is printed elsewhere in this issue of THE CHEMIST.

## Pennsylvania Chapter

The February meeting of the chapter was held as usual in the Board Room of the Engineers' Club, Philadelphia, Pa., on Tuesday, February 5, 1935 at 8:00 P. M. In the absence of Mr. Stoertz, Dr. Trumper presided. Mr. Rivise read the minutes of the January meeting which had been taken by Mr. Newitt. Dr. Stericker reported on the interviews which his committee had had with unemployed chemists registered with the Technical Service Committee of the Engineers' Club. A number of persons on the list have disadvantages which will prevent them from fitting into regular positions. Fortunately, the CWA and LWD have served to reduce the relief rolls. The Committee is now assisting unemployed men with loans secured by a note.

Mr. Cayo discussed the need for better publicity of the Institute's meetings. He suggested that at each meeting of the Philadelphia Section of the American Chemical Society a different member of the Institute should announce the details of the next meeting.

Mr. Jones announced that the March meeting would be held at the Philadelphia College of Pharmacy and that Dr. LaWall would be the speaker.

Mr. Cayo suggested that consideration be given to a Journal of the Institute to take the place of THE CHEMIST. The Journal would be issued twice a year and carry the material previously contained in THE CHEMIST. The secretary was directed to draft a suitable resolution to be presented to the National Council.

Mr. Cayo informed the chapter that Dr. Taggart had had an embolism a few weeks previously and was seriously ill at the Jefferson Hospital. Dr. Proskouriakoff and Mr. Rivise were ap-

pointed as a committee to send Dr. Taggart flowers and to express to him the sympathy of the Chapter.

After the business meeting Mr. Harrison gave his scheduled talk on "Licensing the Chemist." The talk gave rise to considerable discussion, the consensus being that the Chapter was in favor of licensing the chemist in principle. However, those who took part in the discussion were uncertain as to the best plan for carrying licensing into effect. Most of the members present appeared to be against licensing by a political board, and were of the opinion that the Institute should be the logical licensing body. However, the Institute because of its relatively small membership is not yet in a position to make a bid for the task.

The March meeting of the chapter was held in the Museum of the Philadelphia College of Pharmacy. Mr. Stoertz presided. Mr. Rivise read the minutes of the Institute and of the National Council. Messrs. Cayo, Stericker, Stoertz, and Rivise gave their reactions as to the new plans for increasing membership. The thought was expressed that the new plans might result in a let down on qualifications. Mr. Cayo made the excellent suggestion that the individual members send their lists of prospective members to the Chapter Membership Committee instead of to the National Secretary.

Mr. Newitt, Dr. Stericker, and Dr. Proskouriakoff were appointed to the Membership Committee. Mr. Chapin was appointed as Chapter Representative to the Technical Service Committee.

After the business meeting Dr. LaWall gave an interesting talk on the "Early History of Pharmacy and Chemistry."

## Nominations for Councilors

The Committee on Nominations announces that it has suggested the following Fellows as nominees for positions of Councilorship to be filled at the annual meeting in May:

ARTHUR W. BURWELL, *Technical Manager and Vice-president*, Alox Chemical Corporation, Niagara Falls, N. Y.

HANS THACHER CLARKE, *Professor of Biological Chemistry*, Columbia University, College of Physicians and Surgeons, New York, N. Y.

WILLIAM FOSTER, *Professor of Chemistry*, Princeton University, Princeton, N. J.

FRANKLIN D. JONES, *Chief Chemist*, Phillips and Jacobs, 622 Race Street, Philadelphia, Pa.

FREDERICK KENNEY, *Chief Chemist*, Department of Purchase, City of New York, 480 Canal Street, New York, N. Y.

CHARLES A. KRAUS, *Research Professor of Chemistry*, Brown University, Providence, R. I.

GEORGE M. J. MACKAY, *Director of Re-*

*search*, American Cyanamid Corp., 30 Rockefeller Plaza, New York, N. Y.

ALLAN F. ODELL, *Chemical Director*, Du Pont Viscoloid Company, Arlington, N. J.

W. T. READ, *Dean*, School of Chemistry, Rutgers University, New Brunswick, N. J.

NORMAN A. SHEPARD, *Director of Chemical Research*, Firestone Tire and Rubber Company, Akron, Ohio.

MAX TRUMPER, *Consulting Medical Chemist*, 921 Medical Arts Building, Philadelphia, Pa.

These names have been sent to the members with the request that they endorse them or suggest other names as nominees. The six names receiving the highest number of nominating votes will be placed on the election ballot which will be sent to the membership in April.

The Councilors whose terms expire May 1, 1935, are Dr. D. D. Jackson, Mr. Frederick Kenney, and Mr. Albert P. Sachs.

## Applications for Membership

### FELLOWS

WAYNE B. ADAMS, *Chemist*, Department of Food and Drugs, University of Nevada, Reno, Nevada.

SANFORD C. DINSMORE, *State Commissioner Foods and Drugs*, P. O. Box 719, Reno, Nevada.

ALVIN F. SHEPARD, *Research Chemist*, General Plastics, Inc., Walck Road, N. Tonawanda, N. Y.

CHARLES MATTHEW SCHOEPPLE, JR., *Consulting Chemist, Head of Science Department*, Collegiate School, 241 West 77th Street, New York, N. Y.

### ASSOCIATES

NORMAN O. LONG, *Graduate Assistant*, Department of Chemistry, University of Buffalo, Buffalo, N. Y.

EDWARD LLEWELLYN RANDALL, *Chemist*, Food and Drug Laboratory, 5th and Sierra Streets, Reno, Nevada.

### JUNIOR

KERBY STODDARD, *Fellow in Chemistry*, Agriculture Experiment Station, University of Nevada, Reno, Nevada.

### APPLICATION TO BE RAISED FROM ASSOCIATE TO FELLOW

F. W. KINARD, *Instructor in Physiology*, Medical College of the State of South Carolina, Charleston, S. C.

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## NEWS

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At a meeting of the American Institute of Mining and Metallurgical Engineers in New York on February 19th, Dr. Henry A. Buehler, State Geologist and Director of the Missouri Bureau of geology and Mines, Rolla, Missouri, was elected *President*. John M. Lovejoy, president of the Seaboard Oil Company, New York, was elected *Vice-president*. Dr. Paul D. Merica, International Nickel Company, was re-elected as *Vice-president*.

At a meeting of the Chicago Section of the American Chemical Society on February 16th, Dr. W. S. Calcott, F.A.I.C., director of a laboratory of Du Pont's, estimated it would take one chemist 167,500 years to find the 50,000,000 possible color combinations, and would cost about \$25,000,000,000.

The American Institute of Mining and Metallurgical Engineers presented the Saunders Medal for "distinguished achievement in mining" to James MacNaughton, president and general manager of the Hecla Consolidated Copper Company of Calumet, Michigan, at a dinner on February 20th, during their Winter Convention in New York. George C. Stone of New York, an authority on the extraction of zinc, was presented with the James Douglas Medal for distinguished achievement in non-ferrous metallurgy. Francis M. Rich of the Republic Steel Corporation, Youngstown, Ohio, received the J. E. Johnson, Jr., award "for meritorious work in the development of blast-furnace operation under conditions of slow blowing." Thomas Arthur Rickard of Victoria, B. C., received a certificate of hon-

orary membership in recognition "of outstanding achievement as a proponent and preceptor of advanced standards in technical concept and writing, and his brilliant contributions to the literature of geology, mining, and metallurgy."

There will be a meeting of the North Jersey Section of the American Chemical Society on April 8th, at which Mr. John T. Ward, manager of research for the M. W. Kellogg Company, will discuss the new solvent extraction processes now being adopted so widely by the petroleum industry. A round table discussion is being arranged in which representatives of the solvents and heavy chemicals industries will be invited to participate.

Karl M. Herstein, F.A.I.C., has opened an office at the Chemists' Building, 50 East 41st Street, New York, N. Y., where he will act as a consulting chemist, specializing in chemical technology and patents. Mr. Herstein was formerly a consultant with the Hochstadter Laboratories, Inc. The Institute wishes him success.

The Chemical Division of the Department of Commerce calls attention to statistics which show that Alaska used chemical products during 1934 amounting to \$1,037,000, an increase of 31% over 1933. Toilet requisites totalled \$79,500; medicinal purchases, \$181,000; explosives \$354,000, and the balance was distributed in paints, matches, pyroxylin products, and naval stores.

A meeting of the Society of Chemical Industry (in charge), the American Chemical Society, Société de Chimie Industrielle, and the Electrochemical Society, was held at The Chemists' Club, New York, N. Y., on March 8th. Professor Stephen P. Burke of West Virginia University addressed the meeting on "The Combustion of Coal from the Viewpoint of the Chemical Engineer."

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The North Jersey Section of the American Chemical Society held its regular meeting on March 11th at the Hotel Winfield Scott, Elizabeth, N. J. H. V. Churchill, chief chemist of the Aluminum Company of America, spoke on "Aluminum Apparatus in Industry."

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The Nichols Medal Meeting at which the American Chemical Society will award the Nichols Medal to Dr. J. A. Nieuwland will be held at the Hotel Pennsylvania on Tuesday, April 23rd., Dr. A. W. Hixson, F.A.I.C., will preside. The Reverend Eugene P. Burke, C.S.C., of Notre Dame will talk on the personal side of Dr. Nieuwland's life. Mr. E. R. Bridgewater of the Rubber Chemicals Division of E. I. du Pont de Nemours will discuss the practical applications of Dr. Nieuwland's work. Dr. J. M. Weiss, F.A.I.C., will present the medal. The address by Dr. Nieuwland will be on "Basic Research on Unsaturated Hydrocarbons."

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Dr. Alexander Silverman, F.A.I.C., head of the Department of Chemistry, University of Pittsburgh, will make a tour of the Southern Sections of the American Chemical Society, lecturing on "Glass: An Indispensable Factor in Modern Civilization."

Lafayette Benedict Mendel, Sterling Professor of Physiological Chemistry at Yale University, was recently presented with the Conné Medal which is awarded for discoveries in chemistry of pronounced value in the treatment of human disease. This medal was established by Mme. Madelyn Conné three years ago in memory of her late husband Philip A. Conné. This medal was awarded in 1932 to Dr. John J. Abel of Johns Hopkins University, and in 1933, Dr. Henry D. Dakin of Rockefeller Institute was the recipient.

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Florence E. Wall, F.A.I.C., is to act as leader of the chemistry round table at a Career Conference which is to be held at the Hotel Astor, New York, March 29th and 30th, under the auspices of the "Institute of Women's Professional Relations." To show how chemistry can be utilized in unusual fields, Miss Wall will have as her co-leaders, Calm M. Hoke, F.A.I.C., and Lois W. Woodford; and Francesca La Monte of the Museum of Natural History.

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Professor Hugh S. Taylor of Princeton University will address a joint meeting of chemical societies, with the Metropolitan Section of the Electrochemical Society in charge, on "Isotopes and Electrochemistry." The meeting will be held Friday evening, March 15th, at Columbia University.

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#### SOME RECENT PUBLICATIONS BY MEMBERS

*Textile Colorist*, February, 1935.

CHARLES E. MULLIN, "Control and Prevention of Delustering, and Relustering Processes on Synthetic Yarn Materials."

*Chemical Reviews*, December, 1934.

KIRBY E. JACKSON, "Beta, Beta-Prime Dichloroethyl Sulfide."

A pre-convention dinner and meeting of the New York Section of the American Chemical Society will be held on March 19th at the Hotel Taft, where plans for the convention will be announced.

J. F. X. Harold, F.A.I.C., spoke recently at a seminar at Fordham University on "Some Aspects of Patent Law of Interest to Chemists."

The manufacture of yellow pine print paper in the South on a large scale in

competition with imported pulp paper from Canada, Finland, and Russia, is receiving favorable consideration from the Reconstruction Finance Corporation. The experimental work under the supervision of Dr. Charles H. Herty, F.A.I.C., who developed the process, has been carried on with the backing of the State of Georgia, the City of Savannah, and the Chemical Foundation. The fast growing yellow pine trees are ready for cutting from six to nine years after being set out, and experiments show that production on a large scale would be economically sound.

### A.C.S. Program for Spring Meeting

The following program has been announced for the spring meeting of the American Chemical Society:

**Saturday, April 20th and Sunday, April 21st:** Registration.

**Monday, April 22nd:** Group Dinners.

**Tuesday, April 23rd:** Nichols Medal Meeting and dinner at Hotel Pennsylvania followed by dancing.

**Wednesday, April 24th:** Banquet and dancing in Grand Ball Room of the

Waldorf-Astoria.

**Thursday, April 25th:** Complimentary Theatre Party, Centre Theatre, "The Great Waltz."

**Friday, April 26th:** Free Evening.

**Saturday, April 27th:** Special Plant and Laboratory Inspection Trips.

Mornings and afternoons of this week will be devoted to special breakfasts and luncheons, divisional meetings, plant and laboratory inspection trips, and golf.

Charles F. Roth, Chairman of the Ladies' Committee, announces the following entertainment for the women guests as supplementary to the above program:

**Monday, April 22nd, 2:00 P. M.:** Reception at River Club.

**Tuesday, April 23rd, 9:30 A. M.:** Busses leave for visit to estates near Glen Cove, L. I., with luncheon at Piping Rock and/or Creek Country Club. On this afternoon Mr. and Mrs. Francis P. Garvan will be hosts at tea.

**Wednesday, April 24th, Morning:** Reception by Hon. Alfred E. Smith in connection with visit of guests to ob-

servation tower of Empire State Building.

**2:00 P. M.:** Fashion Show by Franklin Simon and Co.

Beauty Talk by Mme. Éléne of Vienna and the House of Pine, N. Y. at Starlight Roof Garden, Waldorf-Astoria Hotel.

**Thursday, April 25th, 2 P. M.:** Bridge and Tea with 15-minute talk by Bridge expert, Starlight Roof Garden, Waldorf-Astoria.

**Friday, April 26th:** Luncheon in Rainbow Room, Rockefeller Centre.

**2:30 P. M.:** Radio Broadcast Hour.



### Suggested Insignia

The Committee upon Insignia has suggested the above design for the insignia of the Institute; which design has been accepted tentatively by the National Council, and is submitted to the membership for its comments.

The alchemistic symbol meaning "the essential thing" is enclosed within a circle to symbolize "all embracing."

The adoption of an insignia will be submitted to the next annual meeting, May 18, 1935.

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### New Members

THEODORE ROBERT MILNE, F.A.I.C., was educated at Massachusetts Institute of Technology. He specializes in metallography, chemical engineering, and cellulose chemistry, and is at present working as supervisor of technical service for Du Pont Rayon Co. at Buffalo, N. Y.

MEYER SAMSON, F.A.I.C., studied at the University of Pennsylvania and the University of Rochester. He is proprietor of the Samson Laboratories of Philadelphia and specializes in clinical diagnostic chemistry and industrial consultation, especially in food, drugs, cosmetics, beverages, and physiological chemistry.

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CARL H. RASCH, F.A.I.C., has degrees from the University of Buffalo and the University of Pittsburgh. He has published several papers on electrochemistry, and at present is chief chemist of the Riverside Chemical Company of North Tonawanda, N. Y.

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MICHAEL RUSSO, J.A.I.C., holds a degree from Cooper Union, specializes in analytical chemistry, and is at present a research chemist for the New York Quinine and Chemical Works of Brooklyn, N. Y.





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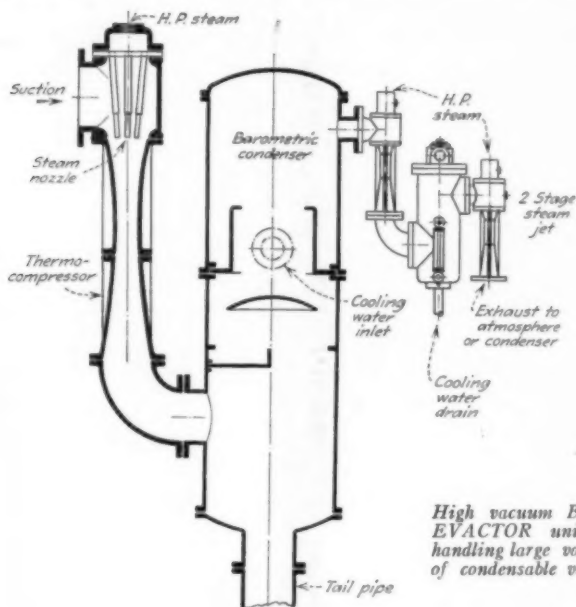
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